JPSS EDR Products Long-Term Monitoring Plan

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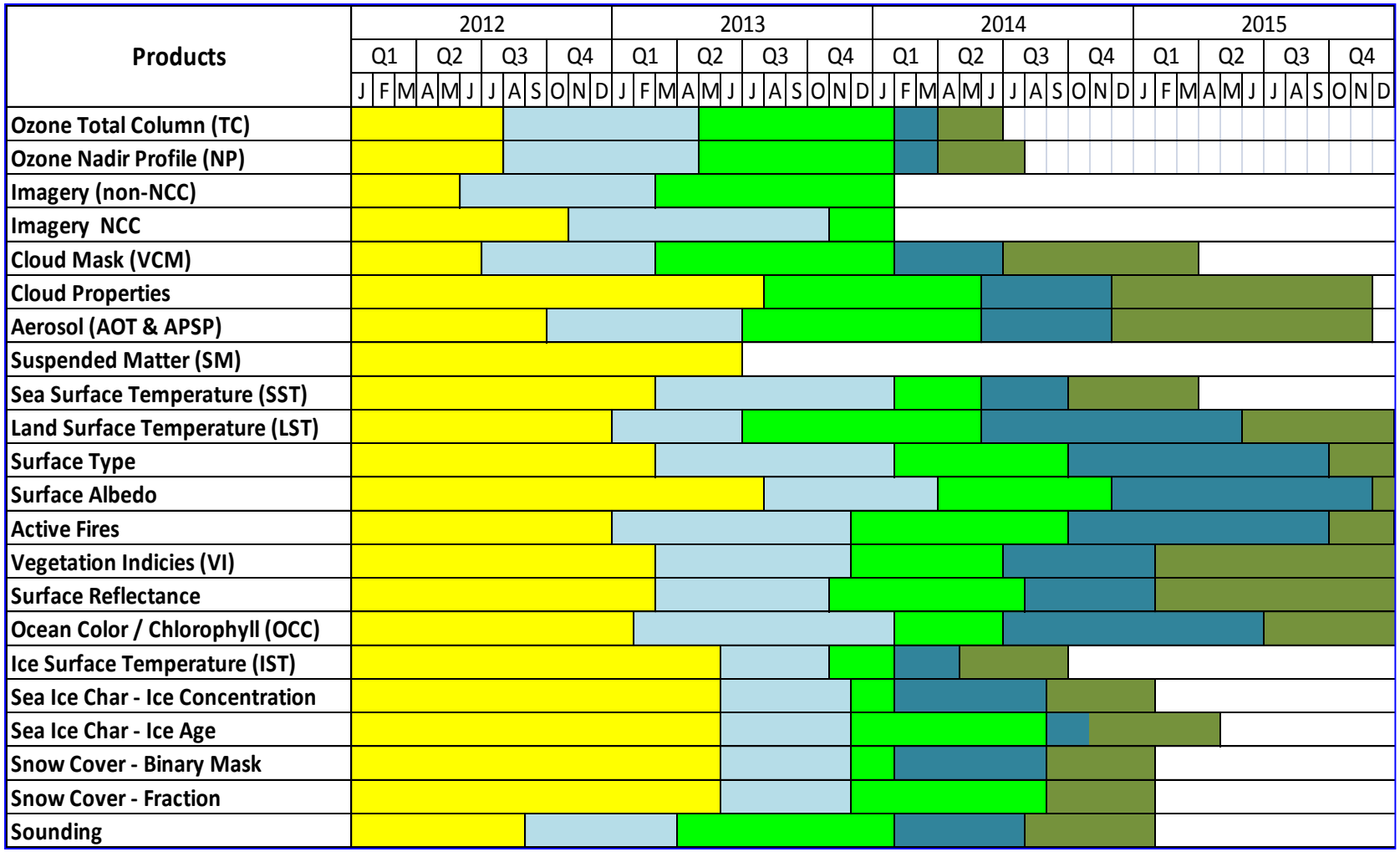
S-NPP SDR Science and Validated Product Maturity Review
December 20, 2013

SNPP EDR Validation Schedule

http://www.star.nesdis.noaa.gov/jpss/Data.php



Beta | Provisional | Stage 1 | Stage 2 | Stage 3

SNPP EDR Long Term Monitoring

- Long term monitoring is a key function of quality assurance for the STAR JPSS Program

- To conduct EDR LTM, teams will:
  - Monitor the products availability
  - Monitor the products quality
    - Compare with truth data
    - Compare with model data
    - Compare with products derived from similar instruments
    - Trend data using time series
  - Detect abnormal events

- Over the past years, STAR has developed tools to conduct this type of Long Term Algorithm Monitoring

- Will work with OSPO and JPSS on Near Real Time product monitoring

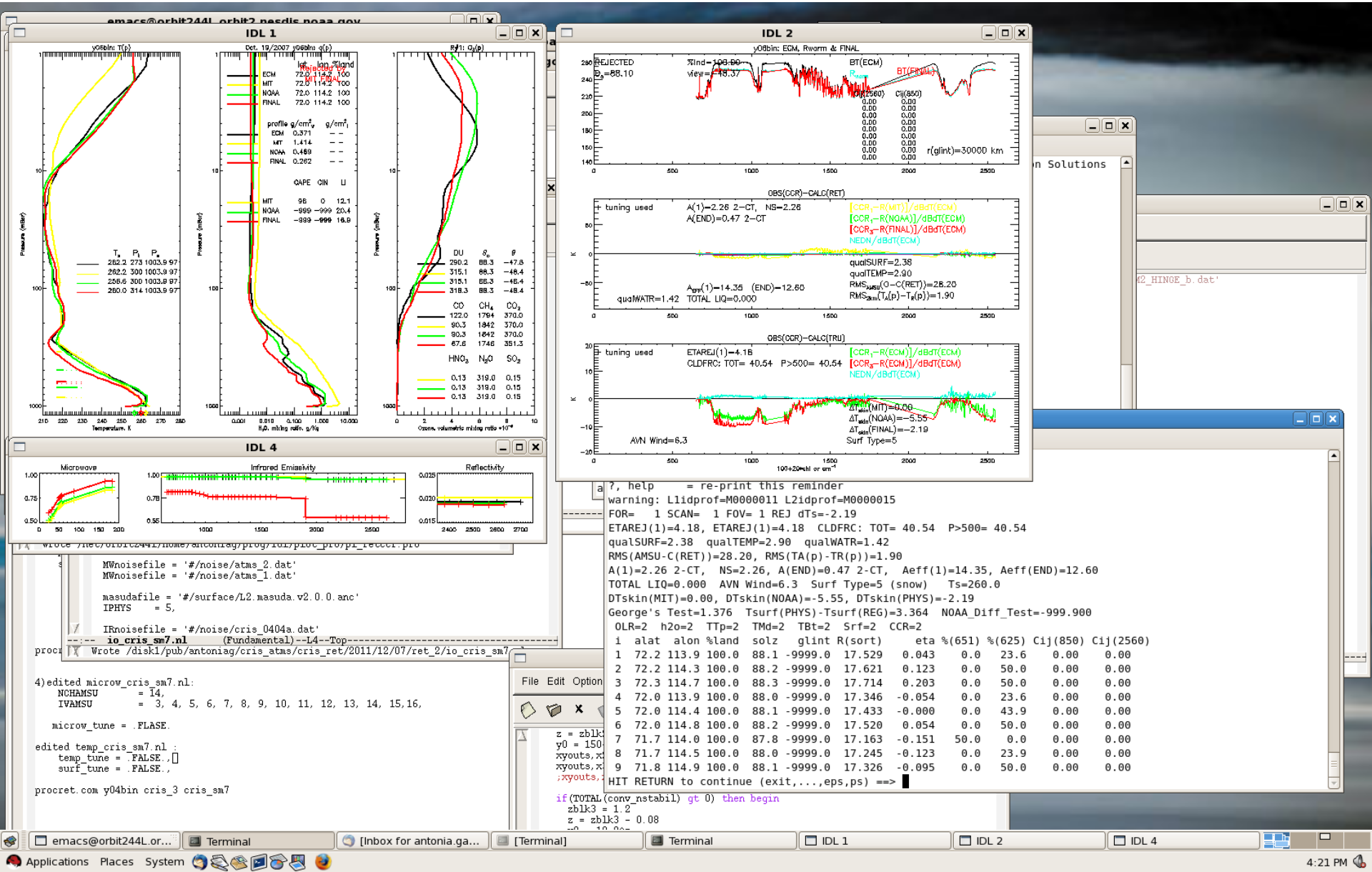
Two Categories of Validation Tools...

- **"Routine" Calibration/Validation Tools**
- **"Deep-dive" Calibration/Validation Tools**

"Routine" Validation Tools	**"Deep Dive"** Validation Tools
Bulk/overview analysis	Detailed/point analysis
Executed soon after product generation	Not executed in real-time. May need to wait for other datasets
Run routinely	Run when more detailed analysis of product performance is needed
Run within OSPO and STAR	Run within STAR
Automated	Automated and/or Interactive components

The following slide shows an example of Deep Dive Validation Tools

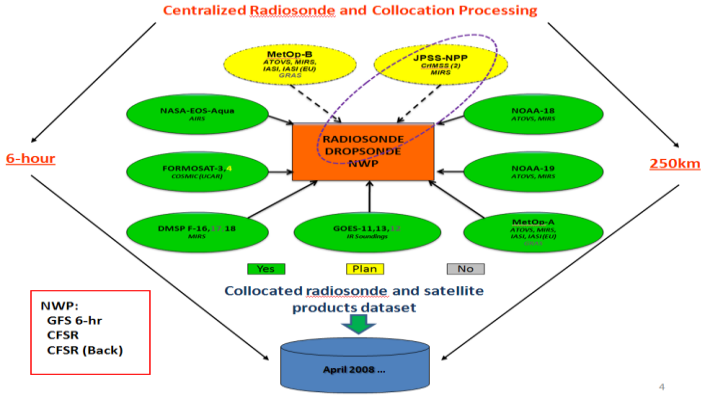
Example: Sounding Deep Dive Cal Val tool (Developed by Chris Barnet)

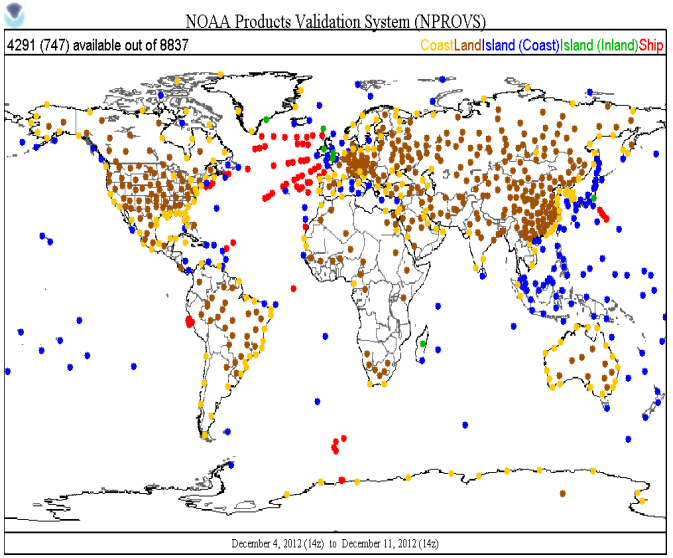


The following slides show examples of Routine Validation Tools

NOAA Products Validation System (NPROVS)

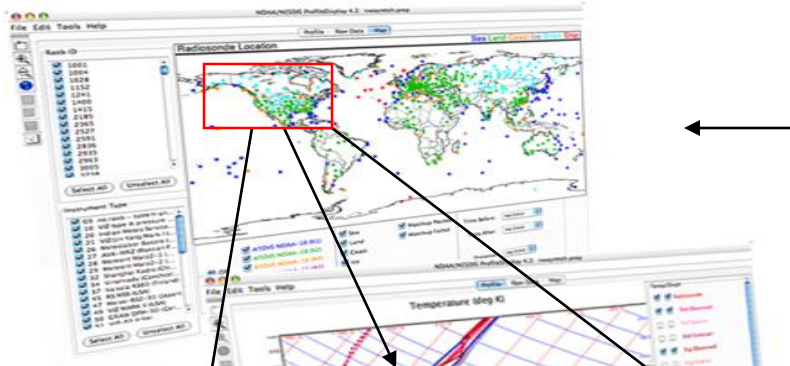
- NPROVS is a powerful interactive system.
  - Can compare a number of operation systems to the operational radiosonde database
  - Lower right: Locations of matchups (6 hour, 250 km) between SNPP soundings and operational radiosondes during the week of Dec. 4-11, 2012.
    - 4291 potential soundings





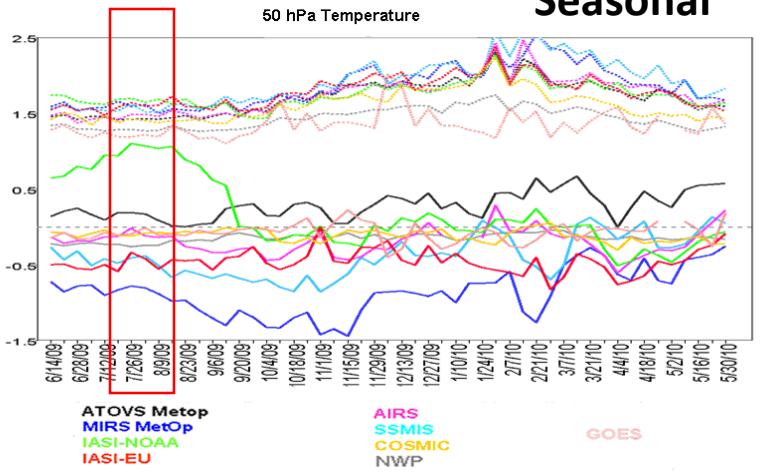
Tony Reale

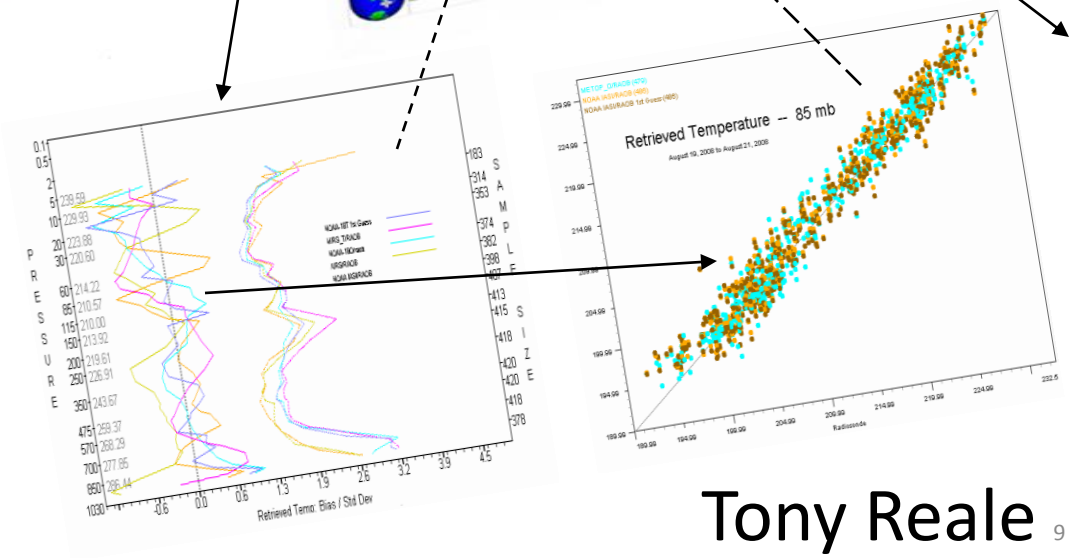
NPROVS Analytical Interface



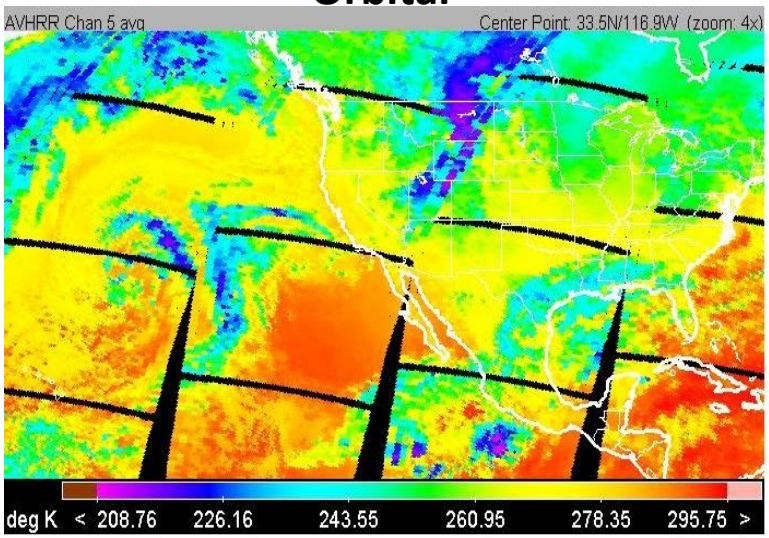
Daily
Weekly

Seasonal



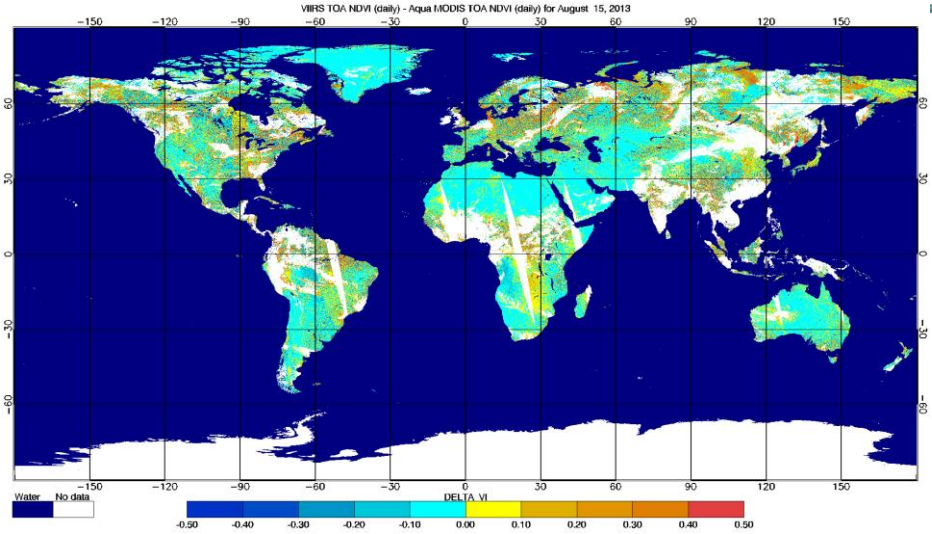


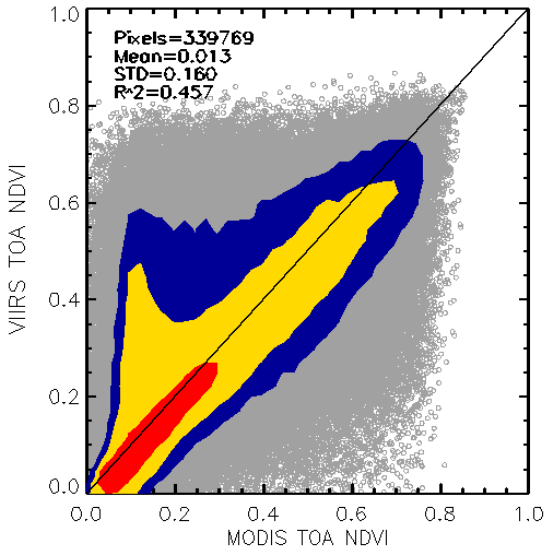
Orbital

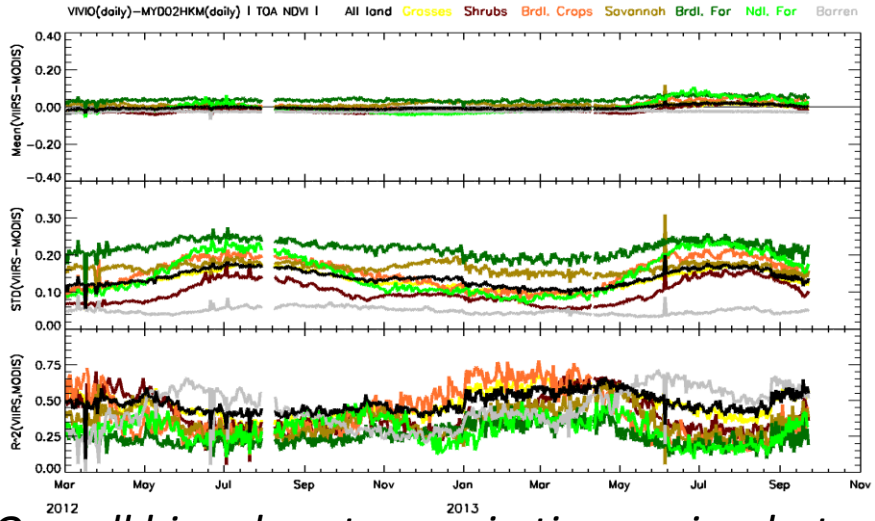


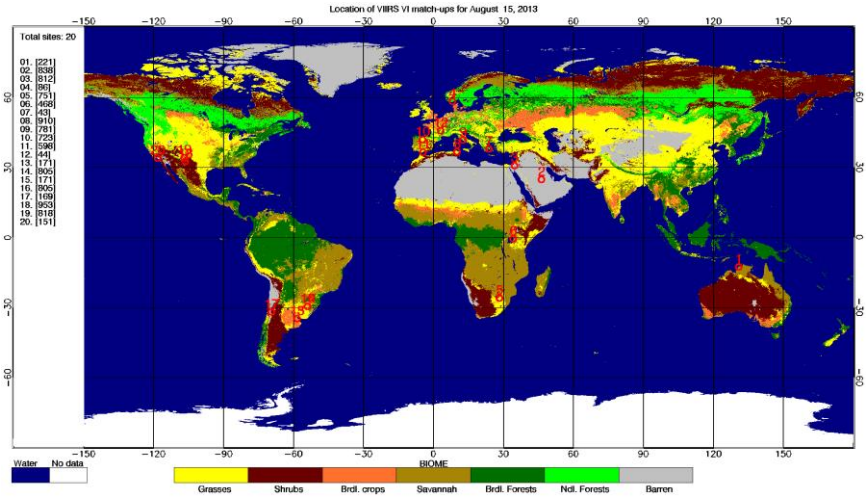
Tony Reale

TOA NDVI: VIIRS vs. MODIS







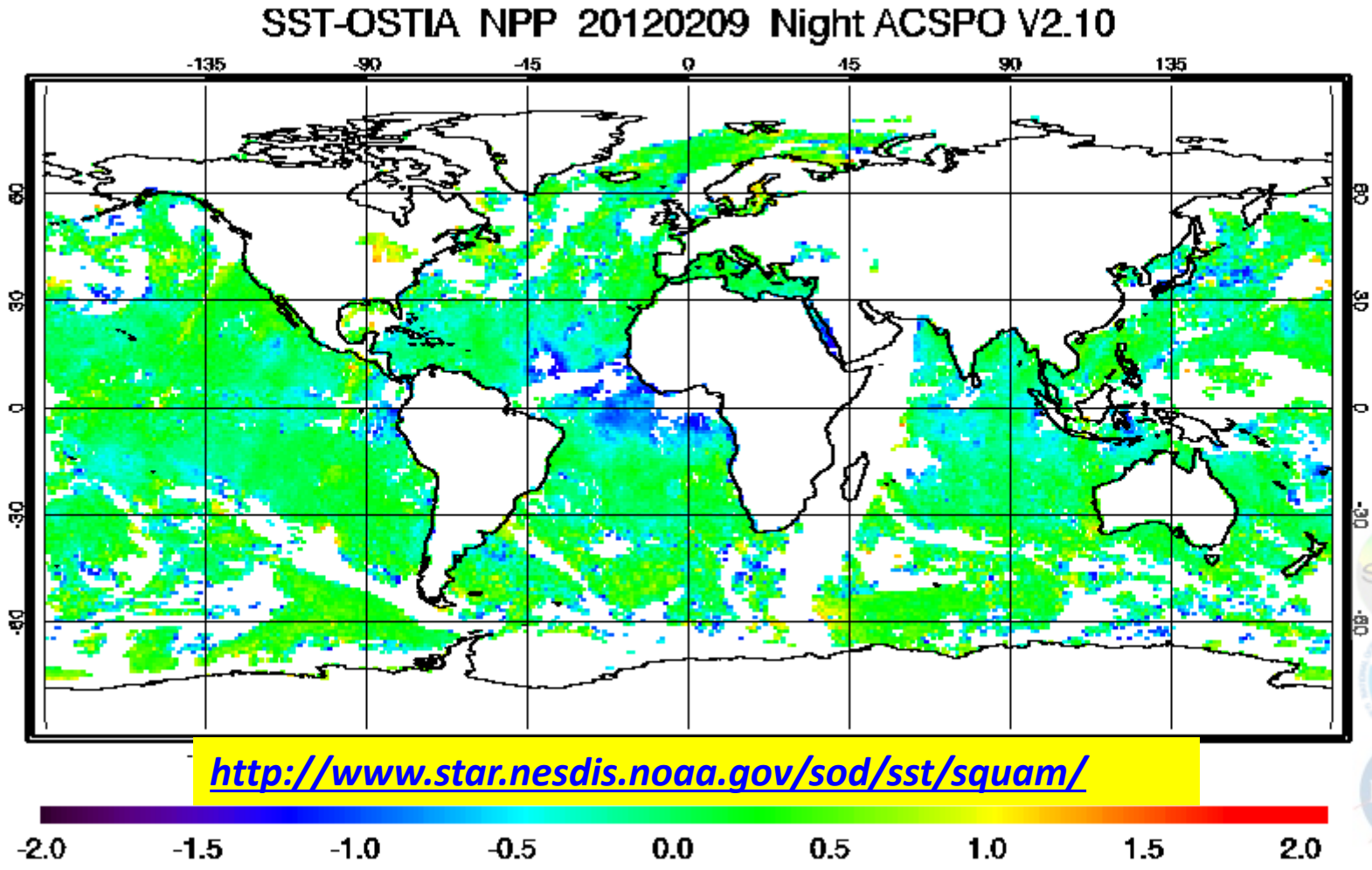


Overall bias close to zero in time series, but VIIRS tends to underestimate MODIS.

Land cover types and AERONET sites

M. Vargas, STAR

SST Quality Monitoring (SQUAM)

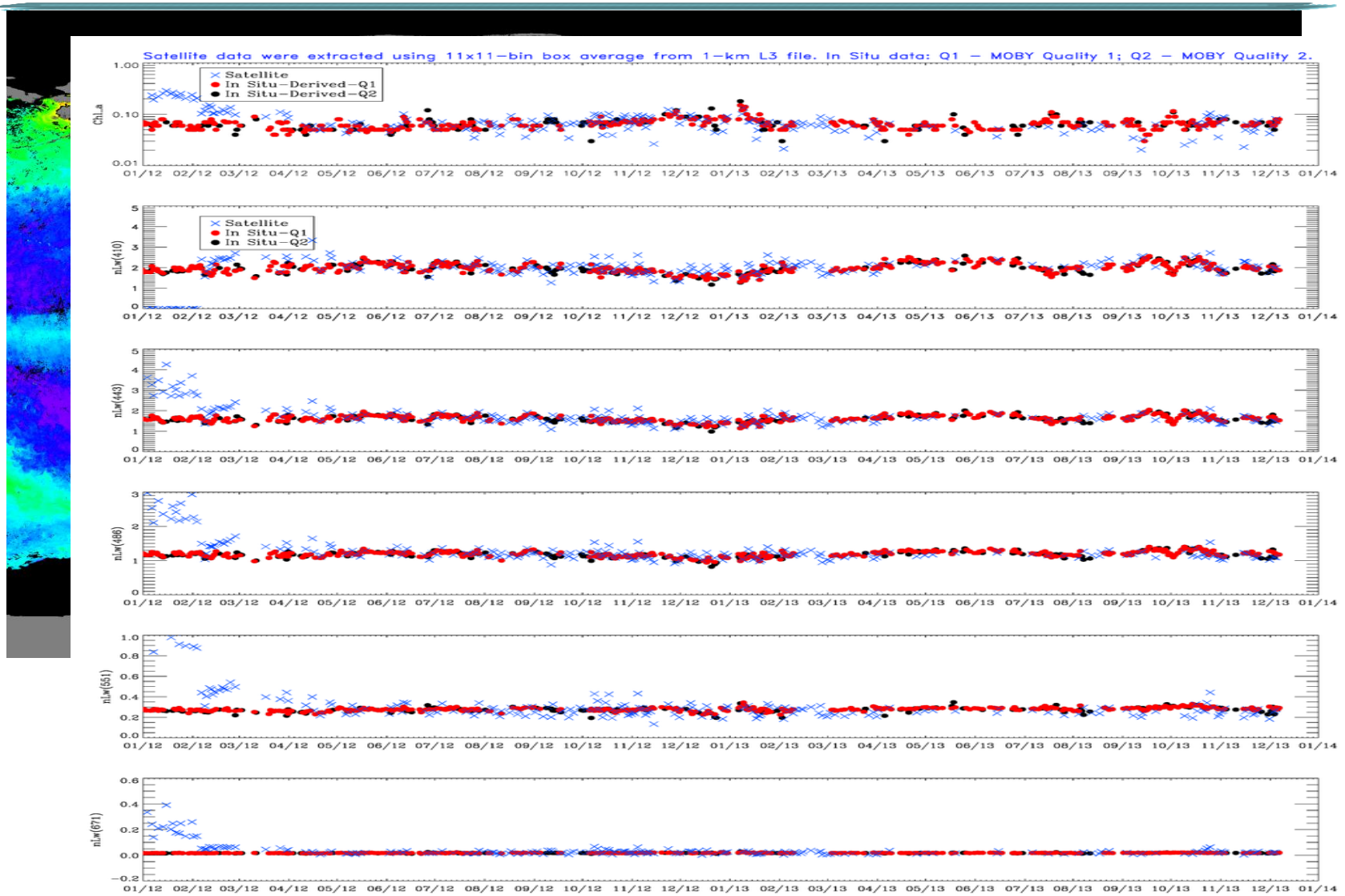


http://www.star.nesdis.noaa.gov/sod/sst/squam/

"Retrieved SST minus first guess" close to zero (normal day)

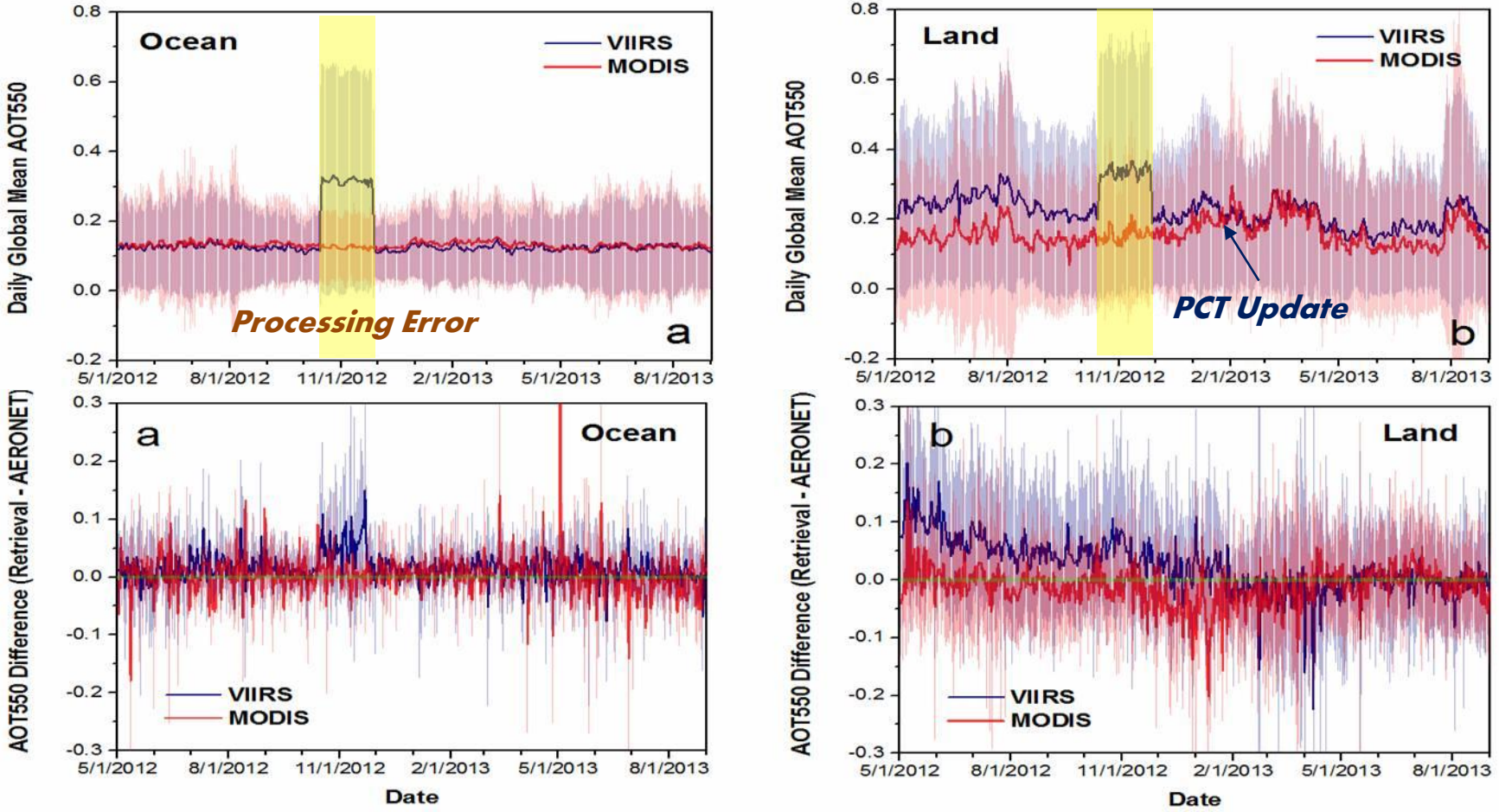
A. Ignatov, STAR

Ocean Color Monitoring



M. Wang, STAR

Aerosol Monitoring



- VIIRS – MODIS: **-0.007** over ocean; 0.083/**0.028** over land before/after PCT update

Slide Curtsey: Aerosol Cal Val team (Hongqing Liu)

S. Kondragunta and I. Laszlo, STAR

Total Ozone monitoring

STAR - Satellite Integrated Calibration / Validation System (ICVS) - NOAA SBUV/2 Products - Mozilla Firefox

File Edit View History Bookmarks Tools Help

STAR - Satellite Integrated Calibration / Vali...

www.star.nesdis.noaa.gov/smcd/spb/icvs/proSBUV2operational.php

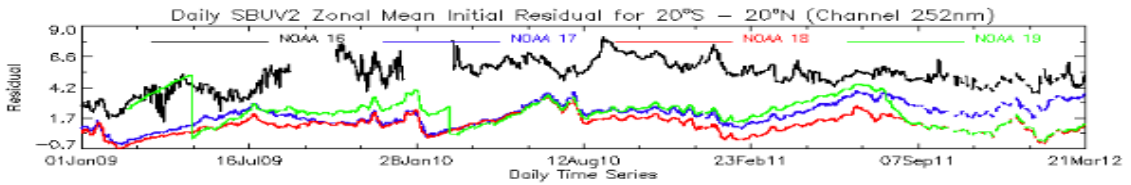
- »NPP/JPSS Instruments
- »Instrument Performance Monitoring - Telemetry
- »Instrument Performance Monitoring - Bias
- »Products Demonstration >>
  - SBUV/2 (Operational) >>
  - SBUV/2 (Released)
  - GOME-2 (Operational)
  - O_3 Product Comparison
  - MICROS

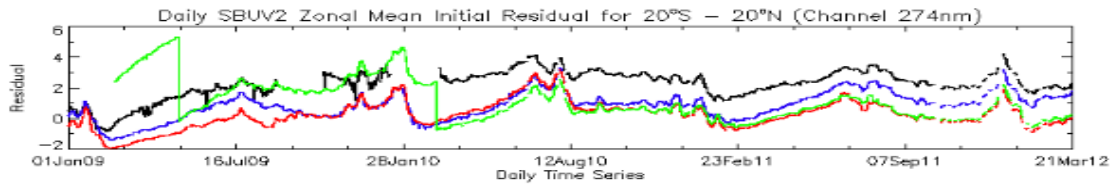
Data and images displayed on STAR sites are provided for experimental use only and are not official operational NOAA products. More information>>

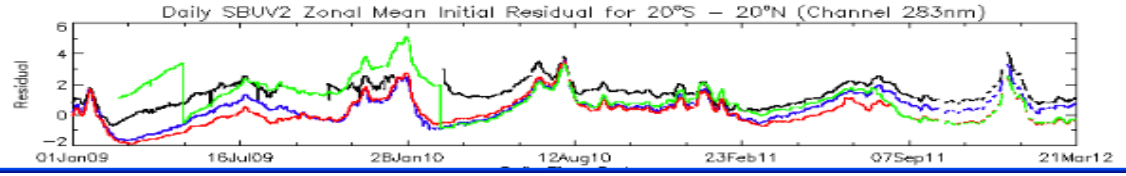
NOAA SBUV/2 Products - Operational

Please select the product index & press 'Display' Button

Daily Zonal Mean Initial Residual: Channel 1-3 [Display]	Daily Zonal Mean Initial Residual STDEV: Channel 1-3 [Display]
Daily Zonal Mean Final Residual: Channel 1-3 [Display]	Daily Zonal Mean Final Residual STDEV: Channel 1-3 [Display]
Daily Zonal Mean Total O_3 Pair Diff: Tropical AB [Display]	Daily Zonal Mean Total O_3 Diff: Column - Profile [Display]
Monthly O_3 Retri-Apriori Profile Diff: February, 2012 [Display]	Weekly Mean 1 Percentile Reflectivity: Min. Top & Max. Bottom [Display]







GOES-R Level-2 Product Monitoring

- GOES-R product monitoring tool has been developed to monitor the output of STAR AIT framework near real-time processing

- This tool has been has been leverage and expanded to monitor NDE NESDIS Unique Products

GOES-R Product Monitoring Tool

URL:

http://www.star.nesdis.noaa.gov/smcd/spb/iosspdt/mtool/Framework_NRT.php

Monitoring Products:

Clouds:

Cloud Mask, Cloud Phase, Cloud Top Products:

NPP_VIIRS, Simulated_ABI, MODIS (TERRA, AQUA), GOES13, GOES15

Winds:

Polar Winds: NPP_VIIRS

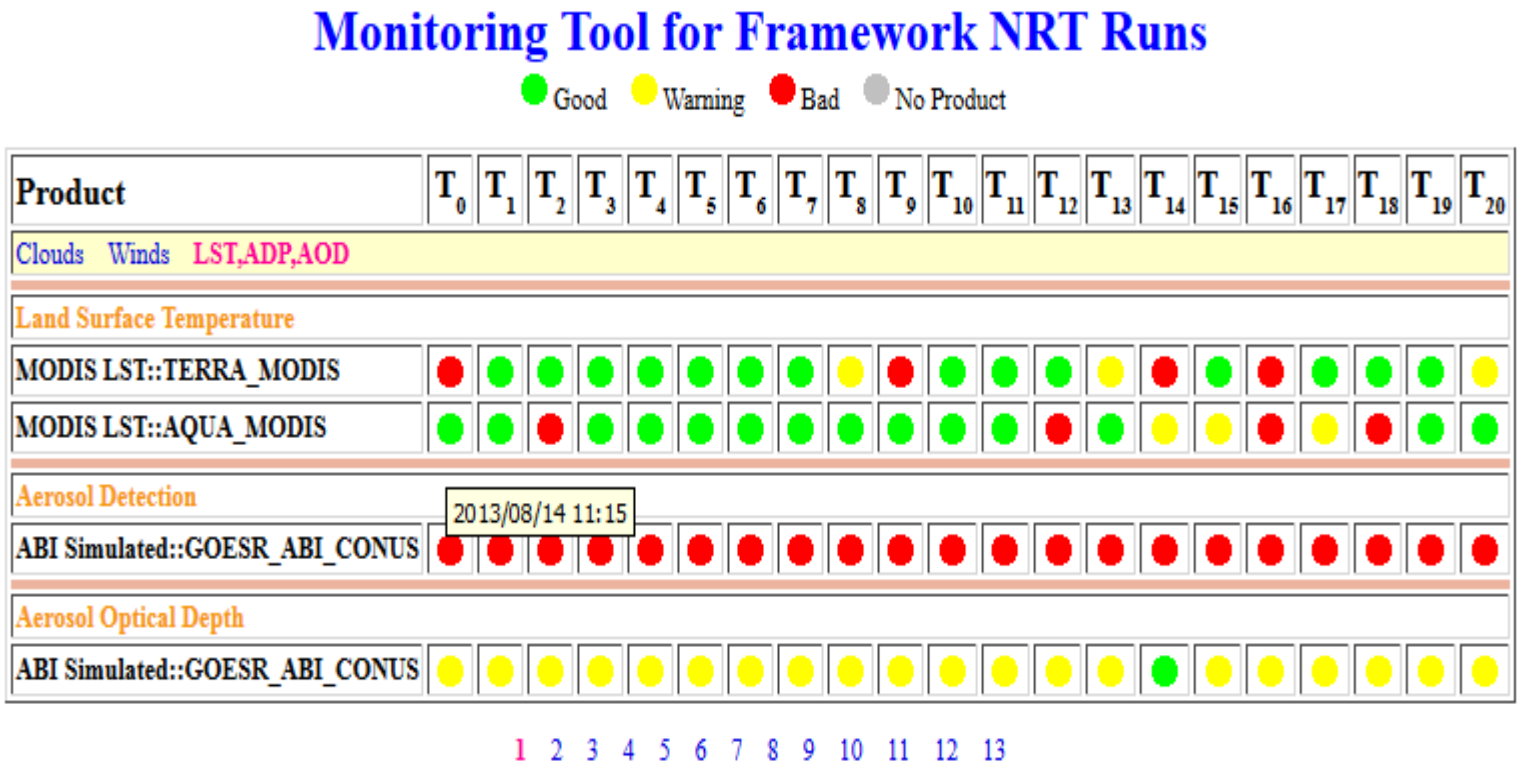
GOES Winds: GOES13, GOES15

Others:

Land Surface Temperature (LST):	MODIS (TERRA, AQUA)
Aerosol Detection (ADP):	Simulated_ABI
Aerosol Optical Depth (AOD):	Simulated_ABI

Easy to add new products

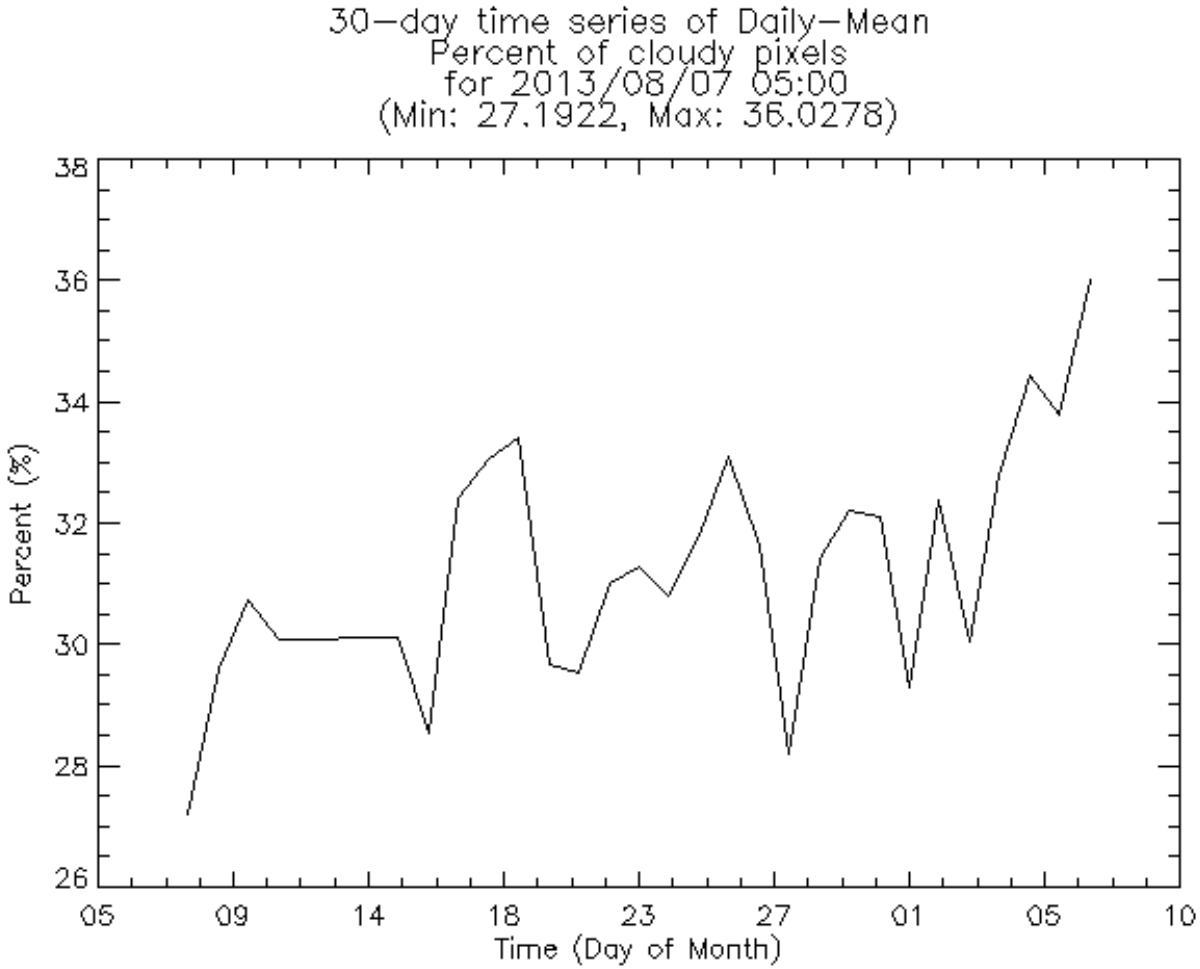
Monitoring Tool Interface



Monitoring Products: LST, ADP, AOD

Simple Interface

Example Trending Plots



30-day time series of percent of cloudy pixels at daily-mean

Details Underneath

JPSS EDR LTM Strategy

- Similarly to ICVS SDR monitoring, the routine product monitoring will be established for EDR LTM
- Leverage the heritage of GOES-R and NDE product monitoring system
- Enterprise Development Approach
  - Standard Interface
  - Common Programs
- STAR will work with OSPO and JPSS to setup EDR product monitoring

JPSS EDR LTM Plan

- Continue routine and deep dive validation tool development & update cal val documentation
- Continue validations on more extensive and complete validation datasets
- Generate/Demonstrate products in near real time environment and set up the near time and long term monitoring capabilities

BACKUP

SNPP EDR Maturity Definitions (1)

- For SNPP, product quality used the following scale

  - **Beta:** Early release product that is minimally validated and may contain significant errors. Establishes baseline for product, available to allow users to gain familiarity, but Product is not appropriate as the basis for quantitative scientific publications studies and applications

  - **Provisional:** Product quality may not be optimal and Product accuracy is determined for a broader (but still limited) set of conditions. No requirement to demonstrate compliance with specifications. Incremental product improvements are still occurring, but version control is in effect. General research community is encouraged to participate in the QA and validation of the product, but need to be aware that product validation and QA are ongoing. Users are urged to consult the EDR product status document prior to use of the data in publications. Product is ready for operational evaluation.

SNPP EDR Maturity Definitions (2)

- **Validated Stage 1:** Using a limited set of samples, the algorithm output is shown to meet the threshold performance attributes identified in the JPSS Level 1 Requirements Supplement with the exception of the S-NPP Performance Exclusions

- **Validated Stage 2:** Using a moderate set of samples, the algorithm output is shown to meet the threshold performance attributes identified in the JPSS Level 1 Requirements Supplement with the exception of the S-NPP Performance Exclusions

- **Validated Stage 3:** Using a large set of samples representing global conditions over four seasons, the algorithm output is shown to meet the threshold performance attributes identified in the JPSS Level 1 Requirements Supplement with the exception of the S-NPP Performance Exclusions